



GOVERNMENT OF
NEWFOUNDLAND
AND LABRADOR



DISCUSSION PAPER

Energy Security for Canada: The Newfoundland Perspective

AUGUST, 1987

Issued under the Authority
of
The Honourable Gerald R. Ottenheimer
President of the Executive Council
and
Minister of Energy

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EXECUTIVE SUMMARY

- The Government of Newfoundland and Labrador strongly recommends that Canada maintain a national policy for energy security. Canada has an abundance of energy supplies in many forms, but faces severe national supply shortages in the key commodity of light crude oil. Canadian energy policy must once again aim towards achieving the objective of national self-sufficiency in oil, and increasing energy supply in other forms where significant opportunities exist.

- Newfoundland can make a major contribution to Canada's energy security in three areas:
 1. Offshore Petroleum Resources
 2. Hydro-electricity Development
 3. Conservation and Alternative Energy

II

1. Offshore Petroleum Resources

- Canada has already passed beyond a brief period of self-sufficiency in light crude oil. This energy form is a critical requirement in the transportation sector, and given the National Energy Board projected shortfalls in supply, new sources of supply must be developed now.
- The Hibernia oil field offshore Newfoundland has the capability to produce 110,000 barrels per day of light crude. It has a minimum reserve potential of 500 million barrels, and an upside potential of one billion barrels.
- Eight smaller fields in the Newfoundland offshore area also have the combined potential to produce over one billion barrels of oil. Some of these smaller fields could contribute within a few years to meeting Canada's supply shortfall. Together with Hibernia, these fields and other potential discoveries in the offshore area represent tremendous opportunity to offset the supply problem in light oil, particularly in those parts of Eastern Canada most vulnerable to supply uncertainties.
- The Hibernia development will make a substantial contribution not only to energy security, but also to economic growth and development. The Hibernia project has been estimated by the developer to provide \$14 billion to Canadian GNP and 129,000 person-years of employment.

III

Industrial benefits will occur throughout Canada, but especially in Ontario, Quebec, the Maritime Provinces and Newfoundland. Employment and industrial development will occur in Canada's most depressed regional economies, making a substantial contribution to national regional development objectives. Another major benefit to future offshore, marine and arctic development will come through the application and transfer of technology associated with this challenging project.

- In order to encourage the development of Hibernia and other frontier fields, Governments in Canada must share with the private sector the risks associated with their development.
- A further policy requirement, is that Governments in Canada encourage renewed levels of exploration and delineation drilling within an appropriate economic environment.

2. Hydro-electricity Development

- The undeveloped hydro-electric resources of Labrador are among the least costly and most environmentally attractive energy sources remaining in North America. Two sites on the Lower Churchill River at Gull Island and Muskrat Falls have the potential to produce 2,300 megawatts of

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hydro-electrical capacity. These developments could contribute significantly to Canadian energy security, and to the energy security of the province of Newfoundland in particular. There are also significant associated economic benefits to these "mega-projects".

- The energy supply future of Newfoundland is hindered by the inability to link energy-rich Labrador hydro sources with the Island part of our province, which is relying increasingly upon smaller, less attractive hydro development, and costly oil-fired thermal generation. This situation has created electricity prices to domestic and industrial consumers which are the second highest in Canada. An electricity interconnection between the Island and Labrador would provide long-term stably-priced electricity to Newfoundland consumers, eliminating the reliance on imported oil for thermal generation.
- An electricity interconnection within the Province cannot proceed without access either to the existing Churchill Falls utility or the development of the Lower Churchill. In either case, surplus energy and power must be transmitted to other markets if these projects are to be feasible. The interprovincial barrier to the transmission

of electricity is an insurmountable obstacle to the development of hydro resources in Labrador.

- As noted in the Communique from the Federal and Provincial Ministers of Energy Meeting of January 30, 1987, national energy policy must provide a framework for the interprovincial movement of electricity, just as it does now for oil and gas, and other energy commodities. Marketing arrangements for potential hydro production in Labrador cannot be made while the neighbouring province refuses to co-operate in permitting the transmission through existing, and as required, supplementary facilities, for the surplus electricity of Labrador utilities. National policies to ensure the interprovincial transmission of electricity will enhance energy alternatives and development across Canada, as other provinces' utilities require access to supply or to markets.
- Canadian energy policy must also ensure that, prior to the determination of electrical energy surpluses for export, Canadian utilities' needs for electricity products are met. These needs must be met within the context of a Canadian energy pricing formula. Finally, there should be equitable export revenue sharing between Canadian exporting utilities providing inter-utility transmission.

VI

- The report of the National Energy Board entitled The Regulation of Electricity Exports, in June 1987, took a strong stand on guaranteeing the right of any province to export electricity regardless of whether or not it has unimpeded access to the U.S. border. On page 44 the report states:

"It is the Panel's view that it is necessary and desirable in the public interest that the Board have the power, perhaps as a last resort, to authorize construction of an export-dedicated line traversing another province.

- We make therefore the following policy recommendations for electrical energy:
- That all Canadians have fair and equitable access to Canadian energy supplies. This requires that there be effective Federal Government regulation of inter-utility transmission access to markets for surplus electrical power and energy; and
- That there be effective Federal Government regulation to define existing Canadian requirements used to determine the level of energy classed as surplus to Canadian needs, and to ensure equitable export revenue sharing between Canadian exporting utilities and other utilities providing inter-utility transmission.

VII

3. Conservation and Alternative Energy

- Conservation and the development of alternative energy sources (mainly biomass) have made substantial contributions in recent years to reducing the growth in energy demand, especially for oil. There remains considerable potential for further energy efficiency in Canada. Conservation continues to provide cost-effective opportunities to ease energy security. Selected alternative energy developments are still attractive at today's oil prices, and can contribute to economic development objectives as well.

- Federal and provincial governments have been actively involved in providing capital, technical advice and general encouragement through conservation and alternative energy programs, with notable success. It is recommended:

that Governments in Canada build upon current
Federal-Provincial Memoranda of Understanding to provide a
long-term framework for funding programs in energy
conservation and alternative energy development.

I. INTRODUCTION

Security of energy supply has long been a mainstay of Canada's energy policy. As a policy objective, it is as valid today as at any time in the past. It is an objective which has been, and should continue to be, supported by all Governments in Canada.

Energy security can be addressed in terms of the total sum of energy supplies, but security in practical terms is constrained by the lack of feasible substitutability among energy sources. In particular, petroleum products used in the transportation sector cannot be replaced by electricity or other energy forms. Electricity on the other hand cannot be substituted by petroleum products for many applications in homes and industry. The goal must be optimum levels of self-sufficiency and security in individual energy forms, in response to the characteristics of their end-uses.

According to recent projections, Canada faces a rapidly increasing shortfall in light crude oil, a shortfall which could become as large as 895,000 barrels per day by the year 2005. Requirements for light crude imports will heighten supply vulnerability in eastern Canada and have a substantial effect on Canada's international balance of payments.

Canada is, however, fortunate to have been so richly endowed with tremendous energy resources. Crude oil, natural gas and hydro-electric resources in Canada , as well as coal and uranium resources, are substantial.

Canada has the human resources, and much of the technology and basic infrastructure to develop new energy supplies. However, energy market conditions and public policy considerations must be assessed before actual development takes place. It is nonetheless necessary to determine our energy priorities, and to give the appropriate weights to the benefits of realizing these priorities over the long term. We must not allow short term market conditions to determine the future of our energy industry.

Discussion of energy security should not be confined to conventional energy alone. There are other factors which contribute to energy security. Conservation leads to more efficient use of energy and thus lowers demand for energy. The use of alternative energy sources as substitutes for conventional energy forms can also contribute to energy security.

Newfoundland can make a substantial contribution to Canada's energy security. This paper address energy security issues in the following three areas:

1. Offshore Petroleum Resources
2. Hydro-electricity
3. Conservation and Alternative Energy

Newfoundland's significant undeveloped resources of petroleum and hydroelectricity can reduce Canada's looming energy vulnerability, and help restore the energy sector as an engine for regional and national economic growth. Conservation and alternative energy sources also have a role to play in national energy security.

II. OFFSHORE PETROLEUM RESOURCES

1. Background

Oil self-sufficiency and security of supply has long been a mainstay of Canada's energy policy. It is an objective which must continue to be supported by all governments in Canada. To abandon that strategy now in the face of a short-term market of cheaper prices would be to ignore the lessons of the past and to place in certain jeopardy the domestic oil supply for the near future.

Canada has already passed beyond a brief period of self-sufficiency in light crude oil. There is little doubt that the recent surplus position was, in large measure, credited to the success of the past commitment to oil self-sufficiency and national security of supply. New sources of oil in Canada's frontier areas, for example, have been discovered as a result of this commitment. Without such policies, it is likely that Canada, instead of having been in the enviable position as a net oil exporter, would now be importing a significantly greater quantity of its oil requirements. We should feel fortunate that we did not have to deal with the reduced economic activity and balance of payments effects that would have otherwise occurred.

Notwithstanding our past success, we should avoid being drawn into a false sense of security. The oil surplus position has already passed. This is illustrated by Figure 1.

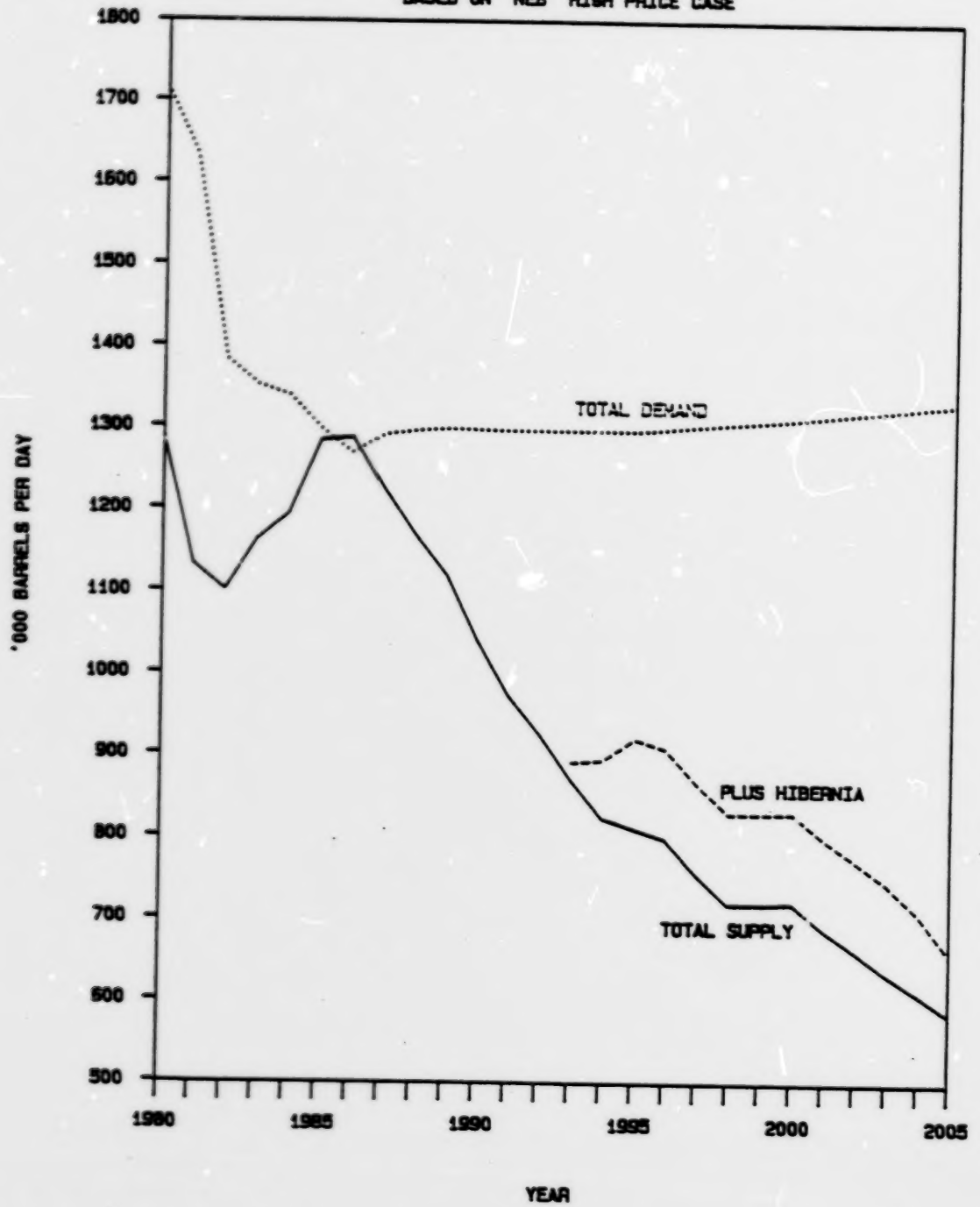
Eastern Canada is critically dependent on oil for its energy supply. Oil is forecast by the National Energy Board to comprise 56% of the end use energy demand in Newfoundland and the Maritime Provinces in 1990. This proportion is much higher than the 32-38% ratio forecast for the rest of Canada in 1990.

2. Oil Security Issues

Canada's energy requirements are complex. Energy is provided in many forms, some of which are integrated in terms of demand end-use. However, not all forms of energy are completely substitutable. For example, electrical energy has little applicability for use in transportation. The National Energy Board predicts that within the next 5 to 8 years, oil demand by the transportation sector alone will exceed the domestic supply of light crude oil. Considering that this shortfall will worsen as existing conventional land-based oil fields are depleted, Canada's oil supply problem will become acute. Crude oil is the lowest cost source of transportation fuel available, with no other known fuel having the characteristics of, and being competitive with, reasonably

Figure 1

SUPPLY AND DEMAND - LIGHT CRUDE OIL
BASED ON NEB HIGH PRICE CASE



priced petroleum. Discussing energy security without addressing oil self-sufficiency fails to recognize the uniqueness and importance of oil in the realities of Canada's economic, social and geographic structure.

The National Energy Board predicts that Canada will again be a net importer of between 258,000 and 300,000 barrels of light oil per day by 1990. By the year 2005, this shortfall will have increased to 530,000 barrels per day and could go as high as 895,000 barrels per day. This shortfall can be translated into an average of approximately \$2.6 billion (1986 \$) per year by 1990 that will go to purchase crude from foreign sources. By the year 2005 this figure would escalate to an average of approximately \$7.6 billion (1986 \$) per year. To anyone genuinely concerned with self-sufficiency, national security of supply and the Canadian balance of payments, these must be alarming projections. Furthermore, the shortfall anticipated under the high price case assumes production from two additional heavy oil upgraders as well as that from the Beaufort Sea and Hibernia. If this production is not realized, the circumstances described above can only be expected to worsen.

Present economic expectations dictate that a concerted national effort is required if Canada does not wish to find

itself at the whim of a potentially unpredictable and unstable international petroleum market by the early to mid 1990's.

Canada must convert its potential resources into economically recoverable reserves to avoid worsening petroleum shortfalls. Given the long lead time necessary to bring new developments on stream, the time for action is now. Development of productive capacity either in frontier areas or from unconventional sources could take six to eight years, or longer.

Throughout Canada, and internationally, there is a growing awareness of the need for policies directed toward ensuring a secure oil supply, both now and in the future. Those who remember the oil embargoes and rapidly escalating prices of the early and late 1970's appreciate the need for concern. Many nations have become increasingly conscious of the dangers of insecure supplies of this strategic commodity. This is particularly true for the United States, West Germany and Japan. Canada, however, is in the extremely enviable position of having the potential to meet its own needs, from its own supplies.

3. Energy Policy Issues

Unlike the United States, West Germany and Japan, Canada has a choice. We can choose to go through the 1990's and beyond as a growing net importer of light oil, or we can choose to develop our own massive oil potential and improve our supply security. Development of the giant Hibernia oil field with a planned production rate of 110,000 barrels per day would represent a significant addition to Canada's oil production capacity. At a cost of approximately \$5.0 billion, Hibernia represents one of the largest capital expenditure programs in Canada in the foreseeable future. An additional \$5.0 billion is estimated for operating and transportation phase activities. Over Hibernia's 20 year life, under current estimates, Canadians will benefit from the production of at least 500 million barrels of oil. It has been estimated that the upside reserve potential is in the order of 1 billion barrels. Simply considering the balance between exports and imports alone, one can see from Figure 1 that, after 1992, Hibernia can make up a significant portion of our projected oil shortfall.

In addition to Hibernia, eight other field developments in the Newfoundland offshore area can potentially be applied to this shortfall. These eight fields are Terra Nova, Whiterose, North Ben Nevis, Hebron, Ben Nevis, Fortune, South Tempest and Nautilus (See Figure 2).

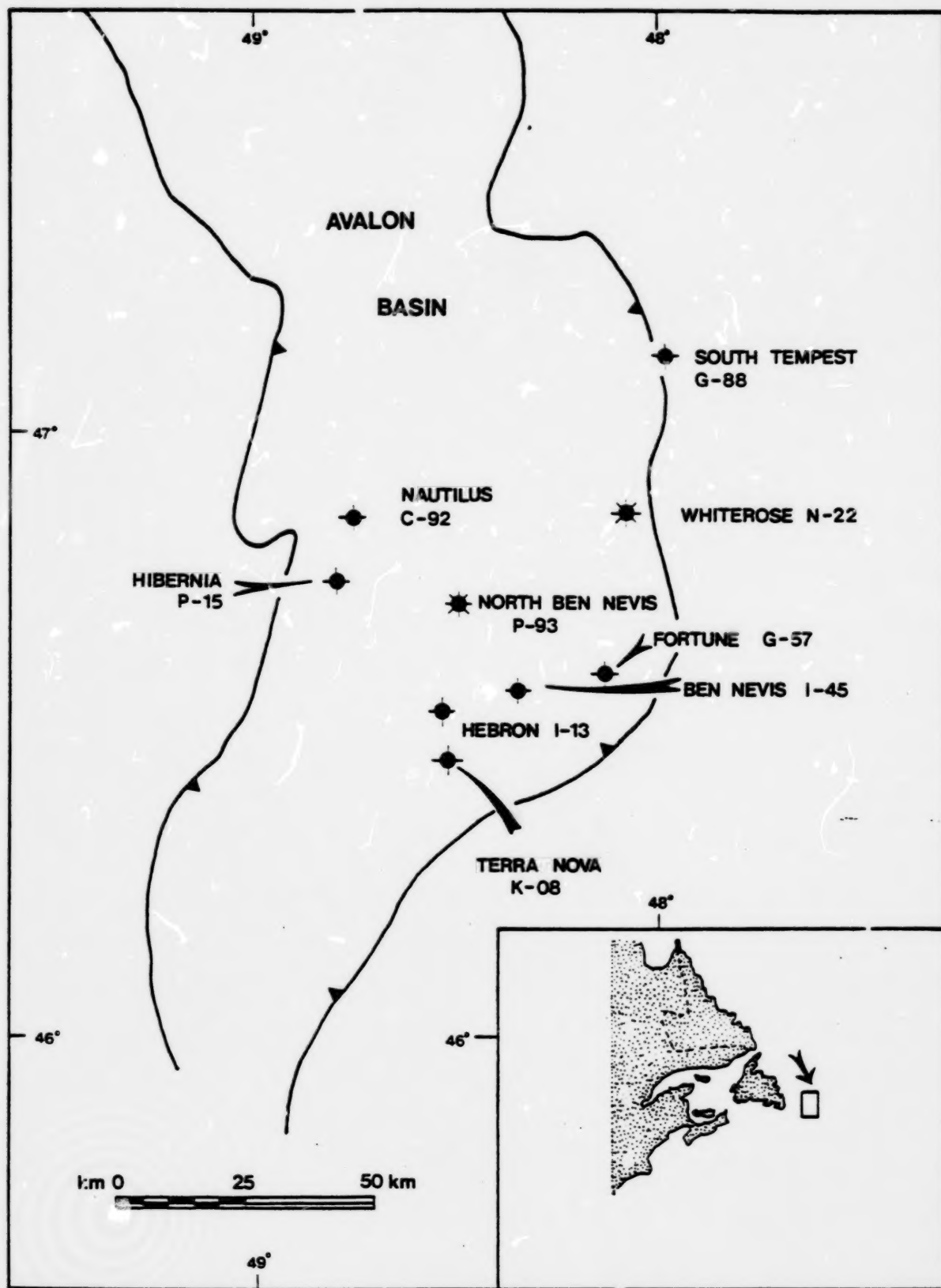


FIGURE 2

The operator of the Terra Nova field, Petro-Canada, has announced plans to develop the field, with first oil production to commence in 1991. The discovery well, K-08, drilled in 1984, tested oil at a rate of 10,000 BPD and 5 delineation wells have been drilled to help confirm the extent of the field. A further two delineation wells are planned, to prove up reserves, and the operator expects to be in a position during 1988 to make a decision on proceeding with production development, and to seek the necessary regulatory approvals. A final decision to begin construction could be made by 1989, leading to initial oil production two years later, from a floating production system. Average production from the field is expected to be between 26,000 and 45,000 barrels of oil per day.

Petro-Canada believes that the Terra Nova field has commercial potential, even in today's lower-price environment and that the western portion alone has sufficient reserves (at least 68 million barrels recoverable) to justify commercial development. Newfoundland is encouraged by the fact that fields as small as 68 million barrels recoverable, appear to be economically viable at today's lower prices.

Planned development of the Terra Nova discovery represents the first step in the development of several smaller fields in the Newfoundland offshore area. Although considerably more delineation drilling has taken place at Terra Nova than at other fields apart from Hibernia, the speculative resource potential for Terra Nova and these other fields is quite considerable.

Upside recoverable resource potential for each of the eight discoveries is listed below:

TABLE 1
(millions of barrels)

Terra Nova	150
Whiterose	300
North Ben Nevis	150
Hebron	150
Ben Nevis	150
Fortune	150
South Tempest Complex	180
Nautilus	70
Total	1,300

Over one billion barrels of recoverable light crude oil is probably contained in these eight discoveries. Further delineation of these discoveries is required in order to translate this potential into proven reserves and, ultimately into production. Recent industry and government studies indicate that the supply cost of producing oil from either of the smaller eight discoveries noted above is competitive in the general context of Canadian frontier development. As a consequence, the development of these eight smaller fields represents an opportunity for Canada to offset much of the predicted domestic light oil supply shortage in the 1990's.

An additional eight billion barrels of undiscovered oil resource is thought to exist in other areas of the Newfoundland offshore. According to the 1983 Geological Survey of Canada Report, "Oil and Natural Gas Resources of Canada", the combined

potential (at an average expectation), is ten billion barrels. If these resources are translated into reserves, they would exceed the total conventional light oil reserves remaining within the rest of Canada and, as such, represent a tremendous opportunity to offset the light crude oil shortages predicted by the National Energy Board.

We therefore believe that Newfoundland has an important contribution to make to the goal of security of supply through development of our offshore fields. We look forward to the opportunities that these types of developments will provide. Hibernia alone, at peak production during the 1990's, will contribute an average daily rate of 110,000 barrels of light oil per day. Up to 250,000 additional barrels per day is possible if all eight smaller fields were to be developed and placed in production during the same time.

4. Associated Benefits

The above discussion refers to Canada's ability to procure and execute large scale oil projects offshore Newfoundland, and to contribute to secure energy supply.

The contribution to national security of supply is a substantial benefit to all of Canada. However, the development of substantial "mega-projects" such as Hibernia will provide

many other economic benefits for Canada. According to Mobil Oil (Canada) Ltd.'s Environmental Impact Statement, the Hibernia development will contribute \$14 billion to Canada's gross domestic product and will generate direct and induced employment of 129,000 person years. The industrial benefits to supply and service the development will provide economic activity throughout Canada, but more particularly in Ontario, Quebec, the Maritime Provinces and Newfoundland.

In Newfoundland and the Maritimes in particular, Hibernia-related development will make an important contribution to regional economic development, in Canada's most disadvantaged regions. Thus, Hibernia development will contribute to national and regional economic growth where, and when it is needed most.

The longer term benefits of Hibernia and other offshore Atlantic exploration, development and production are perhaps most evident in the growth of a lively sector of supply and service firms.

Recent surveys reveal, however, a deep concern that, because of the current downturn, our ability to effectively and competitively complete such work has already suffered, and that if the start of Hibernia is put off until the 1990's, the

foreign content will probably be significantly greater than what is currently estimated.

The Canadian supply community also recognizes that a critical benefit to be derived from the development of oil fields such as Hibernia is the transfer of technology to Canadian firms. They are well aware that this, in turn, will ensure our greater participation in other field developments. Since the offshore Newfoundland developments will challenge the latest technology, it will offer opportunities for Canadian firms to eventually export technology to developments in other parts of the world.

Technology transfer and research and development benefits from Hibernia represent only the beginning. While Hibernia will introduce the technology of the fixed, "gravity-based" production system, other potential petroleum developments offer exciting possibilities in the area of floating production technology. Apart from the production of hydrocarbons, what is most intriguing about such technology is its direct applicability to the more general area of marine operations in arctic and sub-arctic environments. The possibilities that these and the related sub-sea technologies offer for the future, in areas such as marine weather forecasting, navigation and marine mining operations, and for the extension of Canadian sovereignty, especially in the

arctic, seem boundless. The development of the Hibernia and other offshore fields thus offers opportunities which Canada can not afford to let pass.

Policy Recommendations

In light of the above discussion, the Government of Newfoundland and Labrador proposes two general policy recommendations with respect to offshore petroleum resources:

1. That Governments in Canada share with the private sector the risks associated with the development of frontier petroleum resources.
2. That Governments in Canada encourage renewed levels of exploration and delineation drilling within an appropriate economic environment.

III. HYDRO-ELECTRICITY

The Province of Newfoundland and Labrador is extremely fortunate in having not only large petroleum resources in the continental shelf surrounding its shores, but also in having vast undeveloped hydro-electric potential in Labrador. Development of this hydro-electric potential can meet national demand as well as displace thermal generation in Newfoundland and Eastern Canada, thus helping Canada attain its goal of security of supply and energy self-sufficiency in the 1990's and beyond.

As part of energy security, energy equity is also an important national objective. The Federal and Provincial Ministers of Energy, meeting on January 30, 1987, agreed:

"to ensure that all Canadians have fair and equitable access to Canadian energy supplies. in this regard, efforts will be made to reduce institutional and physical barriers to the interprovincial flow of energy".

For hydro-electricity, such barriers exist which prevent Labrador's hydro resources from making a substantial contribution to national and regional energy security, and economic development.

1. Newfoundland's Electrical Energy Situation

Newfoundland's electrical energy situation is characterized by a concentration of demand in the Island portion of the Province, and hydro supply in abundance in Labrador. The present and future energy potential of Newfoundland is blocked by an inability to link these two obviously complementary conditions.

The Island demand for electricity is met by a combination of hydro and thermal facilities, but without access to Labrador hydro, total Island requirements for thermal generation will increase.

The existing requirements of Labrador are supplied from hydro-electric facilities at Churchill Falls. Although the bulk of the output of this plant is sold to Hydro-Quebec under a long-term contract, a total of 300 megawatts is available for provincial use.

Since 1975 Hydro has invested some \$800 million to construct new Island hydro and thermal generation facilities, all of which were known to be less economical than power from Labrador. Current forecasts show that additional generating capacity will be required by 1990 in order to meet the Island's

growing electricity requirements. In the absence of a stably priced source of hydro-electric energy, Hydro will, in 1992, consume in excess of 4.4 million barrels of imported oil at its Holyrood Generation Station, which in turn would require the construction of additional thermal generation capacity. Such thermal generation is not now nor is likely to be as environmentally acceptable as alternative hydro sources in Labrador.

The result of Newfoundland's constrained electrical energy supply has been high electricity prices to consumers. Only Prince Edward Island and Nova Scotia now report higher electricity costs to both residential and industrial consumers. This cost position is deteriorating each year, placing industry in the province at an increased competitive disadvantage.

2. Developing New Sources of Electricity

Newfoundland has recognized since the early 1970's that it possesses among the least costly and most environmentally attractive energy sources yet undeveloped in North America. The hydro-electric resources of Labrador on the Lower Churchill River present a major opportunity to increase Canadian energy supply.

Also since the early 1970's, Newfoundland has recognized that the most economic and environmentally acceptable method of meeting the Island's long-term energy needs is to establish an interconnection between the Island grid and either Churchill Falls or developments on the Lower Churchill. Such a link would permit the acquisition of additional power and energy from Churchill Falls and/or access to surplus power and energy from the neighboring Hydro Quebec system, and eventually access to the output from new hydro-electric plants to be developed at Gull Island and Muskrat Falls.

The untapped hydro-electric potential of the two sites on the Lower Churchill River, Gull Island (1700 megawatts) and Muskrat Falls (600 megawatts), have the ability of totally alleviating Newfoundland's dependence on oil-fired thermal generation. Together they also offer an opportunity to displace significant amounts of imported oil which is used in Eastern Canada for industrial consumption.

The Gull Island project will produce 11.3 billion kilowatt hours annually. This amount of electrical energy from oil-fired thermal generation would require 18.8 million barrels of bunker "C" fuel annually or 52,000 barrels per day. The Muskrat Falls project will produce 4.7 billion kilowatt hours annually, which is equivalent to 7.8 million barrels of oil or 22,000 barrels per day.

Labrador power and energy offers many benefits to Newfoundland, and Canada. It is an energy source that has been judged environmentally acceptable by a Federal Environmental Review Panel. It also offers the dual benefits of security of supply and price stability - important factors for industries and domestic consumers that have had to withstand the uncertainties and price shocks associated with significant dependence on oil-fired thermal generation. In addition, benefits in the areas of employment and increased Canadian industrial activity would be substantial.

A review of the major supply components required in the construction of these hydro-electric and transmission facilities clearly indicates a significant national impact. While Newfoundlanders will be available to supply the majority of the professional, technical and other labour requirements and Newfoundland industries and businesses will undoubtedly provide materials such as cement, lumber, food and other elements; fully 90% of the components required for the construction will be sourced in Quebec, Ontario and the Maritime provinces.

The Gull Island generating site would take approximately six years to construct and would require an investment of \$2.0 billion (1986 dollars), exclusive of

transmission facilities to the Island of Newfoundland and financing charges. This project will require over 1,200 person years of engineering design and site management talent and provide approximately 6,000 person years of construction employment during its development.

The Muskrat Falls project would cost \$1.2 billion (1986 dollars), exclusive of transmission and financing charges. Engineering and management assignments would require 900 person years of effort while an additional 3,800 construction person years of employment would be created during completion of the project.

A high voltage direct current transmission line to bring 800 megawatts of Labrador power to the Island would cost in the order of \$1.1 billion (1986 dollars) exclusive of financing charges. These facilities would employ "state of the art" equipment and construction techniques as well as electrical transmission technology - which is currently available in Canada. Over 700 person years of engineering and management along with 1,100 person years of construction effort would be created during completion of this facility.

These projects, including their associated transmission facilities, have been studied in detail by the joint Federal/Provincial Lower Churchill Development Corporation,

incorporated in 1978, and have been found to be economic and technically feasible as well as environmentally preferred. Marketing and financial plans necessary to fund these projects have been developed.

Hydro-electric developments in Labrador are critically dependent on markets for the energy surplus to provincial needs. Nonetheless, stably priced electrical energy from Labrador is an essential prerequisite for the maintenance and expansion of Newfoundland's commercial and industrial base, as well as for the removal of the uncertainties which surround our Island's dependance on imported foreign oil.

Newfoundland's objectives are consistent with national energy security objectives. They include: (1) termination of the Province's long-term increasing reliance on oil-fired thermal generation and (2) initiation of a resource development strategy, specifically the substantial hydro-electric reserves in Labrador. No part of Canada has a more pressing economic requirement for effective national policies to attain these objectives.

3. Electricity Policy Issues

The development of new Labrador hydro-electric resources, as with the development over twenty years ago of the Churchill Falls facility, has been severely constrained by the lack of a clear national policy and regulatory framework with respect to electricity. All sources of energy production in Canada whether electricity, oil, natural gas, coal or uranium, should be treated equally from a national perspective. An effective mechanism for ensuring the interprovincial transfer and transportation of electrical energy is long overdue.

It is our strong contention that the unconscionable 65-year contract for Churchill Falls power would never have been concluded had Canada ensured the inter-provincial wheeling of energy across Quebec at that time. Newfoundland is forced to export almost 90% of the hydro-electricity generated in the Province while satisfying an increasing proportion of our provincial needs with oil-fired thermal generation.

Today, the future development of the Gull Island site can not proceed without markets for surplus energy outside Newfoundland and Labrador. Suitable arrangements for the marketing of that surplus energy cannot be made while our

neighbouring province refuses to co-operate with Newfoundland utilities to permit the transmission of surplus electricity. The Province of Quebec has the existing grid transmission capacity to accommodate surplus Lower Churchill energy, and could allow Newfoundland Hydro to supplement existing grids where necessary to facilitate further exports.

Provincial boundaries must not act as an impediment to resource development. Federal regulatory authority should be mandated to require and regulate utilities to facilitate inter-provincial and inter-utility power and energy transfers, by providing access upon reasonable terms and conditions to unutilized transmission capacity, and to supplement transmission capabilities where necessary. The Province of Newfoundland is not the only province which can benefit from a national policy of interprovincial electrical transmission. All provinces will benefit from the development of a truly national electricity grid where surplus supply can meet demand on a more equitable and efficient basis than currently, is possible.

The marketing of surplus energy cannot, of course, be separated from electricity exports. Energy equity and security in Canada must also extend to the regulation of exports and the determination of energy classed as surplus to Canadian needs.

Current regulations call for consideration of only those utilities which are "directly interconnected" to the proposed exporting utility. However, no such limitation is prescribed by current legislation. This restriction excludes from consideration any Canadian load which could be served by the proposed exporter over transmission facilities which could and would be economically constructed upon execution of a mutually satisfactory power contract.

Newfoundland contends that the recommended solution lies in "meaningful discussion" which must include the following:

- an implicit attempt to identify the nature of the product required by a Canadian consumer, should evidence be available that a requirement exists, whether short or long-term;
- a specific offer of power and energy to meet the Canadian need or some part thereof at a pre-determined price or on some relevant Canadian energy pricing formula; and
- sufficient and timely discussion between the utilities to display the sincerity of the proceedings on the understanding that these discussions can be terminated by either party when they are demonstrably non-productive.

In the case of Newfoundland, the interconnection which spans provincial borders into Quebec makes it inappropriate and in fact impossible to separate Newfoundland's needs for power and energy in future years from the reality of Newfoundland's export sales to Quebec from Churchill Falls; from Newfoundland's desire to develop the untapped power potential of the Lower Churchill River; or, from Hydro Quebec's own power development and export plans. These matters are clearly and directly linked.

In this context, a truly Canadian energy policy should make adequate provision to withhold the export of power and energy by any Canadian utility, to the extent that the export is made possible only through the import of power and energy from another Province, unless and until an equitable sharing arrangement is in place with respect to the export revenues generated.

In summary, Newfoundland possesses vast undeveloped hydro-electric resources in Labrador which can make a substantial contribution to national energy security. Newfoundland contends that national energy policy can assist in the development of these resources by removing the existing barriers to the transmission of electricity and thereby meeting both national and provincial supply objectives.

4. Policy Recommendations

The Government of Newfoundland and Labrador therefore proposes the following policy recommendations with respect to electrical energy resources:

1. That there be effective Federal Government regulation of inter-utility transmission access to markets for surplus electrical power and energy.
2. That there be effective Federal Government regulation to define existing Canadian requirements used to determine the level of energy classed as surplus to Canadian needs, and to ensure equitable export revenue sharing between Canadian exporting utilities and other utilities providing inter-utility transmission.

IV. ENERGY EFFICIENCY AND ALTERNATIVE ENERGY DEVELOPMENT

While the province's most important contributions to Canada's future energy security will be through the development of its offshore petroleum resource and Labrador hydro-electric power, it must not be overlooked that energy security can also be increased by improvements in the efficiency of oil and electricity use and by development of indigenous alternative energy resources, mainly biomass. Conservation and alternative energy development also offer other important benefits in the form of energy cost savings for consumers, employment and disposal of waste products which can reduce potential environmental damage.

Recent analysis by the Newfoundland Department of Energy indicates that each \$100 million invested in energy conservation and alternative energy projects would yield annual savings to energy users of approximately \$20 million, create 4,500 person-years of temporary employment plus 150 permanent jobs, and result in \$26 million in increased tax revenues to the federal and provincial governments. This analysis was based on a world oil price of \$20 U.S. per barrel.

The benefits are clear, but what is the overall potential? A recent report by the Federal Department of Energy Mines and Resources (dealing with the opportunities and barriers of

conservation and renewable energy) concluded that there are attractive economic opportunities in all sectors and all regions, even at today's lower oil prices. This report found that improved energy efficiency and increased alternative energy use have the potential to reduce national conventional energy requirements by some 800,000 barrels of oil equivalent per day by the year 2000 (approximately 700,000 BOE/day for conservation and 100,000 BOE/day for alternative energy).

Newfoundland's share of this potential would be approximately 16,000 BOE/day (13,000 BOE/day for conservation and 3,000 BOE/day for alternative energy). This is roughly equivalent to 40 per cent of the present oil consumption of the province. Total investment by energy users in the province to achieve the overall potential, (giving an average 20% rate of return or better) would be in the order of \$700 million and such represents the most cost-effective energy option for the province.

The Government of Newfoundland and Labrador is fully aware of the multiple benefits and considerable potential of energy conservation in all sectors and all regions, and of alternative energy development utilizing extensive local resources of fuelwood and peat, municipal refuse and other natural energy forms. Over recent years both the provincial and federal Governments have been very active in promoting increased

investment in viable conservation and alternative energy projects. Joint and parallel programs have addressed the main barriers of shortage of capital, lack of knowledge of the technologies involved and lack of perception as to the economic benefits.

These programs have had a clear impact. The \$47 million spent by the Federal Government in the province on the home insulation and oil substitution programs is largely responsible for the 39% reduction in light fuel oil consumption in the residential sector from 1980-1985 resulting from energy conservation and conversions to wood and electricity. Demonstration projects and information/education programs started under the \$9 million federal-provincial energy demonstration program and continuing under the \$7 million M.O.U. on Conservation and Alternative Energy have been effective in raising the level of knowledge about, and confidence in, conservation and energy alternatives. Provincial energy programs for government facilities have resulted in improved overall efficiency and a number of conversions to woodchip heating.

More needs to be done however, to realize the significant economic impacts that energy conservation and alternative energy resource use can have. The Province is considering the expansion of current programs with the intent of providing increased incentives for viable projects aimed at regional development and employment within the province. This would

contribute to the national effort to improve security of energy supply.

However, the province's fiscal position leaves it with limited ability to act unilaterally in this area. In the interests of regional economic development, and to ensure maximum co-ordinated impact for whatever programs are implemented, joint federal and provincial funding is a necessity.

It is therefore recommended:

1. That Governments in Canada build upon current Federal-Provincial Memoranda of Understanding to provide a long-term framework for funding programs in energy conservation and alternative energy development.

V. CONCLUSIONS: NEWFOUNDLAND'S CONTRIBUTION TO CANADIAN
ENERGY SECURITY

Canada has an abundance of energy supplies in many forms, but faces severe national supply shortages in the key commodity of light crude oil. All available projections are for growing net import requirements in the 1990's and beyond, presenting a clear threat to Canadian energy security.

Dependence on imported oil in all forms has been the rule in Newfoundland and other eastern Canadian provinces for decades. The prospect of further net imports increases this region's dependence and vulnerability to potential supply shortages and inevitable price increases in the future. Supplies of Canadian light crude from conventional sources, even in emergency situations, are unlikely to be effectively delivered to the Maritime Provinces, let alone Newfoundland.

In the meantime, significant energy resources in Newfoundland remain undeveloped. Offshore hydrocarbon resources on Newfoundland's continental shelf have the potential to produce 10 billion barrels of oil over the long term. Hydroelectric resources in Labrador could provide 2,300 megawatts of capacity generation. The development and production of these resources could contribute substantially to

economic growth and development throughout Canada, especially in the severely disadvantaged economy of Newfoundland.

Newfoundland can make a significant contribution to energy security for Canada, both at a national level and to meet our own energy demand in the province. This contribution will require co-operative efforts of federal and provincial governments to recognize the potential of the energy opportunities, to remove the barriers to development that exist, and to get on with the job, for the benefit of all Canadians.

1. Offshore Petroleum Resources:

Development of Newfoundland's offshore petroleum resources will make a substantial contribution to reducing the shortfall in light crude oil supplies. The development of the Hibernia field will provide 110,000 barrels per day of a projected 300,000 b/d shortfall by the early 1990's. Together with other potential east coast fields, this oil production will go a long way towards correcting the strategic imbalance of a lack of available national supply in eastern Canada. It will provide a significant cushion against the supply uncertainties associated with imported oil, in the regions of Canada most vulnerable to those uncertainties.

The key policy requirement for the development of the Hibernia project is for Governments to share with the private sector the risk associated with the six-year development of this project.

Finally, Governments should also continue to consider the economic environment required to maintain adequate levels of exploration activity in the frontier areas, in particular to continue the delineation of promising fields to be developed after, or in conjunction with, Hibernia.

2. Hydro-electricity:

Two sites for hydro-electric development on the Lower Churchill River in Labrador are among the largest untapped energy sources anywhere in North America. The difficulties experienced by the Province of Newfoundland in pursuing this major contribution to Canadian energy resources have further compounded our own energy supply problems.

The Province has continued its dependence on imported oil for electrical generation on the Island; a dependence which will continue to increase with demand. An 800 megawatt transmission interconnection from Labrador would transform the long-term energy security prospects for the entire Province, enabling the complete substitution of oil for electrical

generation and provide further substitution for domestic and industrial users. This line can only be constructed if a supply is provided from existing hydro-electricity from Churchill Falls or from the development of the other Labrador sites.

The further development of the two Lower Churchill sites, Gull Island, 1700 megawatts (mw), and Muskrat Falls, 600 mw, would provide for Canada the equivalent in thermal generation of 74,000 barrels of oil per day - a substantial contribution to energy security. Electricity surplus to Newfoundland's needs could be marketed to other provinces or exported to the United States. This surplus could therefore make a major contribution either to national supply or to Canada's trade balance. These Lower Churchill projects could proceed to construction immediately. The obstacle to development is not economic feasibility, but institutional, interprovincial barriers to trade.

In order for Newfoundland's hydro-electric potential to become reality, national energy policy must provide a framework for the interprovincial movement of electricity. This should include as two key elements:

- National regulation of interprovincial transmission of electricity to allow for clear and unfettered wheeling of

power and energy to interprovincial and international markets in the same way that exists presently for oil and gas; and

- Further expanded federal regulatory authority to ensure that surplus electricity from Canadian utilities is offered on a fair and prior basis to adjoining Canadian utilities at domestically determined prices, before export approval is granted, and to ensure that export energy revenue is shared equitably to interconnected utilities which contribute to the surplus for export.

3. Conservation and Alternative Energy Development

Federal and provincial programs to promote conservation and alternative energy development have made substantial contributions to Canada's energy security. Potential remains to increase the role of such measures to reduce oil dependency in particular. In order to continue to realize the energy security and related economic development benefits from these programs, continued support is required of all Governments.

In summary, Canadians should not be lulled to a false sense of security with regard to their energy supply. The prospects for increased dependence on imported light crude will significantly expose the Canadian economy to the risk of international supply uncertainties. Newfoundland is as

vulnerable, or more so, than other parts of eastern Canada in this respect.

Policy initiatives to remove the undue risk to major offshore petroleum and the institutional barriers to hydroelectric developments in Newfoundland will make a substantial contribution to Canada's energy security. Conservation and alternative energy technology also have a role to play. These initiatives will allow the energy sector to be the engine for growth not only in a highly depressed region of Canada, but throughout all of Canada.

SUMMARY OF POLICY RECOMMENDATIONS

1. That Governments in Canada share with the private sector the risks associated with the development of frontier petroleum resources.
2. That Governments in Canada encourage renewed levels of exploration and delineation drilling in the offshore frontier areas, within an appropriate economic environment.
3. That there be effective Federal Government regulation of inter-utility transmission access to markets for surplus electrical power and energy.
4. That there be effective Federal Government regulation to define existing Canadian requirements used to determine the level of energy classed as surplus to Canadian needs, and to ensure equitable export revenue sharing between Canadian exporting utilities and other utilities providing inter-utility transmission.
5. That Governments in Canada build upon current Federal-Provincial Memoranda of Understanding to provide a long-term framework for funding programs in energy conservation and alternative energy development.